

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/US2004/020704

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C08F291/00 C08F291/18 B01D71/28 B01D71/78 C08F259/08  
C08F255/02

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C08F B01D C08J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 359 019 B1 (STONE CHARLES ET AL) 19 March 2002 (2002-03-19) column 1, lines 5-22 column 2, line 25 - column 6, line 46; claims 1-39 ----- WO 01/58576 A (BALLARD POWER SYSTEMS INC; STONE, CHARLES; STECK, ALFRED, E) 16 August 2001 (2001-08-16) page 1, lines 5-29 page 8, lines 20-26 page 12, lines 19-21 page 4, line 20 - page 12, line 21 page 13, line 19 - page 20, line 30; claims 1-62 ----- -/-	1-12
X		1-5,7-10

 Further documents are listed in the continuation of box C. Patent family members are listed in annex.

## ° Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

25 May 2005

Date of mailing of the international search report

06 OCT 2005

Name and mailing address of the ISA

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 03/018654 A (BALLARD POWER SYSTEMS INC; STONE, CHARLES; BONORAND, LUKAS, M) 6 March 2003 (2003-03-06) page 4, line 19 - page 9, line 15; claims 1-58 * example * ----- US 4 113 922 A (D'AGOSTINO ET AL) 12 September 1978 (1978-09-12) column 4, lines 35-57 column 3, line 12 - column 5, line 20; claims 1-5; tables 1-6 -----	1-5,7-11 1-5,7-10
P,X	WO 2004/026929 A (BALLARD POWER SYSTEMS INC; MACKINNON, SEAN, M) 1 April 2004 (2004-04-01) page 1, lines 5-8; claim 1 page 4, line 27 claims 10,30,31,39 page 7, lines 23-28; claims 15,1-46 page 4, lines 17-28 page 3, line 14 - page 5, line 5 page 7, line 14 - page 9, line 5 -----	1-5,7-11
X	US 2002/137806 A1 (STONE ET AL) 26 September 2002 (2002-09-26) paragraphs [0001] - [0003] paragraphs [0015] - [0068]; claims 1-85 -----	1-5,7-10
X	US 4 169 023 A (SATA ET AL) 25 September 1979 (1979-09-25) column 4, lines 18-55 * examples * column 3, line 3 - column 5, line 36 -----	1-5,7-10
A	US 4 384 941 A (OKAMOTO ET AL) 24 May 1983 (1983-05-24) abstract column 2, line 32 - column 3, line 50; claims 1-7 -----	1-12
A	US 4 481 306 A (MARKUS ET AL) 6 November 1984 (1984-11-06) abstract column 2, line 24 - column 4, line 23; claims 1-26 -----	1-12
A	US 4 396 727 A (ISHIGAKI ET AL) 2 August 1983 (1983-08-02) claims 1-18 -----	1-12
A	US 5 536 754 A (FEIRING ET AL) 16 July 1996 (1996-07-16) abstract; claims 1-12 column 1, line 5 - column 3, line 15 -----	1-12

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 03/006515 A (E.I. DU PONT DE NEMOURS AND COMPANY; BEKIARIAN, PAUL, GREGORY; FARNHAM) 23 January 2003 (2003-01-23) abstract; claims 1-34 page 1, line 30 - page 8, line 32 -----	1-12

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International application No.  
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### Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.: because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
  
3.  Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

### Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1.  As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
  
2.  As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
  
3.  As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
  
4.  No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1 - 12

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-12

A fluorinated polymer suitable for ion exchange prepared by grafting at least one grafting monomer of formulae 1a or 1b, onto at least one base polymer as described in the application claim 1.

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2. claims: 13-17

An independent ion exchange membrane which is not dependent on any preceding application claim. The said membrane comprising fluorinated polymer as described in application claim 13.

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3. claims: 18-31

An independent grafting process as described in application claim 18, which is not dependent on any previous application claim.

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4. claims: 32-39

An independent catalyst coated membrane comprising various surfaces as described in the application claim 32, and not dependent on any previous application claim.

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5. claims: 40-59

An independent membrane electrode assembly as described in the application claim 40, and not dependent on any previous application claim.

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6. claims: 60-72

An independent electrochemical cell as described in the application claim 60, which is not dependent on any previous application claim.

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## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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Patent document cited in search report		Publication date		Patent family member(s)		Publication date
US 6359019	B1	19-03-2002	AT AU AU CA WO DE DE EP JP	213006 T 733804 B2 1017699 A 2309631 A1 9924497 A1 69803801 D1 69803801 T2 1034212 A1 2001522914 T		15-02-2002 24-05-2001 31-05-1999 20-05-1999 20-05-1999 21-03-2002 20-06-2002 13-09-2000 20-11-2001
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